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ABSTRACT

This report was commissioned by the Utah State Office of Education (USOE) to provide USOE with information about the potential applications of distance learning technology in schools. The study includes: (1) a statewide assessment of instructional, staff development, and administrative needs which may be met by distance learning technology; and (2) a district by district inventory of technology equipment currently available for distance learning purposes. Data were collected at seven regional focus group meetings. A full day was devoted to an overview of distance learning technology and presentations on four specific distance learning applications (the audiographic, the simplex television, the duplex television, and the satellite systems) as well as structured discussions with over 300 teachers, principals, administrators, board members, and parents. Survey responses of all 40 school districts in the state of Utah yielded actual counts of various kinds of technology equipment existing in schools around the state, as well as the number of schools with satellite reception and video transmission capacity. Findings of the study indicate that science, math, and foreign languages at the elementary school level and advanced placement courses at the secondary school level would benefit most from distance learning applications. Costs for initial capital outlay, staff training, and ongoing operating and maintenance expenses were identified as major obstacles to implementing distance learning technology. The appendices include all survey response data, as well as copies of the discussion guide, technology inventory forms, and evaluation forms used in the study. (Author/DB)

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A STUDY OF DISTANCE LEARNING TECHNOLOGY IN UTAH: A STATEWIDE OVERVIEW

June, 1989

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A Study of Distance Learning Technology in Utah: A Statewide Overview

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June, 1989

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The Laboratory would also like to acknowledge the contributions from our group facilitators David Coe, Kerry Davis, Connie Dela Pianna, Roger Miller, Peg Roland, and Chuck Shackett, who travelled to regional meetings to facilitate small group discussions and provided us with valuable field notes.

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Executive Summary

This report was commissioned by the Utah State Office of Education (USOE) to provide USOE with information about the potential applications of distance learning technology in schools. The study, undertaken by Far West Laboratory for Educational Research and Development (FWL), includes: (1) a statewide assessment of instructional, staff development, and administrative needs which may be met by distance learning technology and (2) a district by district inventory of technology equipment currently available for distance learning purposes.

Far West Laboratory conducted two major data collection activities in March and April 1989. The first activity was a series of seven regional focus group meetings held in Moab, Orem, Salt Lake City, Ogden, Cedar City, Salina, and Heber City. At each regional meeting, a full day was devoted to an overview of distance learning technology and presentations on four specific distance learning applications (the audiographic, the simplex television, the duplex television, and the satellite systems) as well as structured discussions with over 300 teachers, principals, administrators, board members, and parents. The second data collection activity was a survey of all 40 school districts in the state. Survey responses yielded actual counts of various kinds of technology equipment existing in schools around the state (computers, modems, video disk players), as well as the number of schools with satellite reception and video transmission capacity.

Findings of the study indicate that Science, Math, and Foreign Languages at the elementary schools and advanced placement courses at the secondary schools would benefit most from distance learning applications. The duplex technology is preferred; however, it is also recognized as the most costly and may be impractical for most schools. Costs for initial capital outlay, staff training, and ongoing operating and maintenance expenses are major obstacles to implementing distance learning technology. Adequate funding to support distance learning applications is essential.

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A STUDY OF DISTANCE LEARNING TECHNOLOGY IN UTAH: A STATEWIDE OVERVIEW

INTRODUCTION

Utah has been in the national forefront in using Distance Learning (DL) Technology for instructional purposes. The Utah State Office of Education (USOE), the public television station (KUED), colleges and universities, other post-secondary institutions, Regional Service Centers, and a number of school districts and consortia of school districts have experimented with a variety of DL applications. The USOE is currently taking a leadership role in gathering baseline information about educational needs in the state which can be met with distance learning technology and about the current availability of various kinds of technology equipment in districts throughout the state. The information procured through a contract with Far West Laboratory (FWL), will be used by USOE to develop a statewide plan for increasing productivity in education through the effective use of DL Technologies.

This is the final report of FWL's study. It consists of the Introduction, Study Objectives, Study Procedures, Description of the Sample, Study Findings, and a Summary of Findings.

STUDY OBJECTIVES

The study was undertaken by FWL on behalf of USOE, specifically members of the Distance Learning Task Force. The overall purpose of the study is to provide descriptive information to USOE about perceived needs and capacities for DL technologies throughout the state. Specifically, the study is designed to collect the following types of information.

A statewide assessment of instructional, staff development, and administrative needs which may be appropriately met by DL Technology.

A statewide inventory of technology equipment currently available in school districts throughout the state which may be utilized for DL purposes.

STUDY PROCEDURE

The design for the study was developed jointly by FWL staff and members of the USOE Technology Task Force. It consists of the following features:

For data collection purposes, the state was divided into seven regions. These regions correspond, in large part, to the regions of the Regional Service Centers. They are: Region 1, Southeastern Education Service Center Region; Region 2, Utah Valley Region; Region 3, Salt Lake Region; Region 4, Northern Utah Region; Region 5, Southwest Educational Development Center Region; Region 6, Central Utah Educational Service Region; and Region 7, Northeastern Utah Educational Service Region. Table 1 shows school districts by region.

Table 1

Utah School Districts by Data Collection Regions

Region	School District
1. Southeastern Education Service Center Region (SESC)	Carbon Emery Grand San Juan
2. Utah Valley Region (UV)	Alpine Murray Nebo Provo
3. Salt Lake Region (SL)	Davis Granite Jordon Salt Lake
4. Northern Utah Region (NU)	Box Elder Cache Logan Ogden Tooele Weber
5. Southwest Educational Development Center Region (SEDC)	Beaver Garfield Iron Kane Millard Washington
6. Central Utah Educational Service Region (CUES)	Juab North Sanpete Piute Sevier South Sanpete Tintic Wayne
7. Northeastern Utah Educational Service Region (NUES)	Daggett Duchesne Morgan North Summit Park City Rich South Summit Uintah Wasatch

Two major data collection activities were conducted in March and April 1989. The first major data collection activity was regional focus group meetings. At each of seven regions in the state, USOE and FWL staff conducted a one-day meeting to which teachers, administrators, board members, parents, and representatives from institutes of higher education were invited. These regional meetings were held on the following dates:

Region 1 (Moab) . March 13, 1989
Region 2 (Orem) . April 6, 1989
Region 3 (Salt Lake City) . April 7, 1989
Region 4 (Ogden) April 10, 1989
Region 5 (Cedar City) . April 11, 1989
Region 6 (Salina) . April 12, 1989
Region 7 (Heber City) . April 13, 1989

At each site, a full day was devoted to presentations and structured discussions about technology applications (See Appendix A for Agenda). In the morning, USOE staff as well as expert consultants on specific technology applications made presentations including: an overview of DL Technology and of the Audiographics, Simplex Television, Duplex Television, and Satellite DL models. After lunch, the participants were placed in groups of peers with similar roles. With the help of a group facilitator, they participated in a structured discussion on how instructional, staff development, and administrative needs might be met by the appropriate use of DL Technology.

Group discussions followed a process consisting of the following steps: First, the discussion facilitator administered the Core Curriculum checklist (See Appendix B) which asked participants to check the Core Curriculum areas in which DL Technology can be used as a valuable tool, and to list those areas (from 1 to 5) in which participants would first begin to use DL. Second, the facilitators led the group through a discussion focused on three topical areas in which DL Technology might be useful: student instructional services, staff training and assistance, and administrative uses. For each discussion topic, participants were asked to respond in writing to questions about priority areas, the most appropriate technology application for each priority area, implementation obstacles, and, in the case of administrators, how the new technology might be funded (See Appendix D). After participants completed their written responses to each of the three topical areas (instructional services, staff training, and administrative uses), the facilitator led the group in sharing their responses and in developing consensus among group members. Notes taken by the facilitators were provided to FWL for this report.

The second data collection activity was a mail inventory survey (See Appendix C for survey instrument) distributed to all districts in the state. The survey was designed to yield actual counts of various units of equipment, such as computers, modems, video disk players, as well as number of schools with access to a variety of technology applications, such as satellite reception and video transmission capacity. In addition, the survey asked for information about courses which are currently being offered through DL Technology. With assistance from USOE, FWL staff constructed a list of "knowledgeable" people in the schools who either have the information about existing hardware at hand or who can easily get it from others in the district. These knowledgeable staff members may be superintendents, media coordinators, or other central office staff. In some cases, the survey instrument was sent directly to the principals.

DESCRIPTION OF THE SAMPLE

Regional Meetings

Participants in the regional meetings included ten role types: school board members, district level administrators, elementary site administrators, secondary site administrators, elementary teachers, secondary teachers, elementary parents, secondary parents, representatives from institutes of higher education and others. Table 2 displays the total number of participants by role type in each of the regional meetings.

Table 2

Regional Meeting Participants by Role and Region
(N=301)

Role	Region[1] 1	2	3	4	5	6	7	Total	%
Board Member	0	2	0	2	0	1	1	6	2.0
District Level Administrator	7	8	9	7	3	3	2	39	13.0
Elementary School Administrator	4	8	2	2	4	1	0	21	7.0
Secondary School Administrator	7	9	5	5	6	3	2	37	12.3
Elementary Teacher	7	15	11	9	4	3	5	54	17.9
Secondary Teacher	7	11	12	12	7	1	9	59	19.6
Elementary Parent	4	6	3	1	2	1	3	20	6.6
Secondary Parent	2	11	6	10	6	1	3	39	13.0
Post-Secondary Representative	0	0	1	0	2	0	1	4	1.3
Other	3	6	6	4	0	1	2	22	7.3
Total	41	76	55	52	34	15	28	301	100

[1] 1. Southeastern Education Service Center Region, 2. Utah Valley Region, 3. Salt Lake Region, 4. Northern Utah Region, 5. Southwest Educational Development Center Region, 6. Central Utah Educational Services Region, 7. Northeastern Utah Educational Services Region

A total of 301 educators and parents attended the seven regional meetings. The largest group attending was teachers (N=113), followed by administrators (N=97), and parents (N=59). Board members and representatives of post-secondary institutions did not attend in large numbers. Attendance in the meetings varied from region to region, with a low of 15 in Region 6 to a high of 76 in Region 2.

Technology Inventory Survey

The DL Technology Inventory was distributed in the following manner: Of the 40 districts in the state, it was determined that 27 of the smaller districts had one knowledgeable technology specialist or superintendent who could respond to all the questions in the survey. A survey form (Form A) was distributed to these individuals who represented districts in the SEDC, SESC, NUES and CUES Regions in addition to Box Elder School District.

For the remaining 13 larger districts, it was felt that no single individual is likely to be knowledgeable about the entire district's technology inventory, and that the survey must be sent to central office administrators as well as building principals. Form B asked about district-owned systems and capacity and was distributed to central office staff. Form C asked about equipment or systems located in the school buildings. Form C of the survey was distributed to building principals only. Central office staff from all 13 districts responded to the survey. Out of 374 schools which received Form C, 231 schools returned the survey. For the non-responding schools, projections of equipment were made based on a ratio of student enrollment to units of equipment available from other schools in the same district. Appendix C contains Forms A, B, and C of the survey instrument.

As a result, data on the inventory of technology equipment are available from all of the 40 districts in the state. In 30 of these districts, data reported to FWL represent all the building in the districts; in 10 districts, reported data are constructed from projections based on student enrollment from schools which responded to the survey. (Three of these districts--Salt Lake, Murray, and Tooele--chose to have one member of the district staff complete the inventory on behalf of the entire district.)

Findings of the study are reported in two sections: the results of the regional needs assessment meetings and the inventory of technology equipment in the state.

REGIONAL NEEDS ASSESSMENT FINDINGS

Data from the seven regional needs assessment meetings are organized to determine how target groups answer the following questions:

Which instructional areas would benefit most from DL technology?
What staff training areas would benefit most from DL technology?
What administrative functions would benefit most from DL technology?
Which DL technologies are preferred for various priority areas?
What are possible obstacles to successful implementation of DL technology?
How should DL technology be funded?

Instructional Services

In the work groups, participants were asked to complete two worksheets pertaining to instructional issues. One worksheet listed all core curriculum subjects required at the elementary and secondary levels, and asked educators and parents to indicate which, if any, core courses might benefit from Distance Learning applications, and in which of those courses should Distance Learning technologies first be applied. A second worksheet asked participants to consider the broader area of instructional services, and indicate five areas in which Distance Learning applications might be effectively applied.

Elementary Instructional Priorities

Table 3 reports priority elementary instructional areas which might benefit from DL applications and with which courses districts should start if implementing DL in schools.

Table 3

Priority Elementary Instructional Areas:
Percent of Respondents who perceived Elementary Core Curriculum areas as "Useful" for DL Technology and who ranked as among the Top Fifteen core areas to "Start with."
(N=139)

	Useful (%)	Start With (%
Science	89.2	71.9
Foreign Language	80.6	48.2
Visual Arts	72.7	45.3
Math	70.0	51.1
Music	61.9	25.9
Soc Stud-Citizen	58.3	36.0
Healthy Life	56.1	25.9
Information Tech I	56.1	30.9
Listening	55.4	25.2
Information Tech II	43.9	9.4
Drama	43.2	11.5
Soc Stud-Prin & Prac	43.2	8.6
Reading	40.3	18.0
Speaking	40.3	12.9
Writing	39.6	18.7

Most elementary educators and parents (89.2%) believe that Science is the subject area in which DL technology might be most useful, and if districts begin to implement DL at the elementary level, participants (71.9%) feel that Science instruction is where DL technology should first be applied. Comments from the various regions suggest why Science is so clear a priority at the elementary level. A number of remarks point to the tension between the growing push to improve Science instruction nationally and in Utah,

and elementary teachers' general lack of training in Science. One teacher noted: *"There is so much to draw on that no one person is qualified to do it all. Teachers and students could be introduced to science experiments that they can do at home. Teachers could team teach. One teacher could develop a unit on weather and teach all the students; another could develop a unit on insects, and so on."*

Comments that capture these views are: *"Traditionally, elementary teachers have focused on language arts and ....They don't have much training in Science so they tend not to spend much time teaching it....and they certainly don't have planning time to gather materials for hands-on Science....Even if they did have time to plan, managing a large classroom of fifth graders doing lab work is tricky, messy, even scary for some teachers."* Both teachers and administrators saw value in using interactive DL technologies to provide professional development for elementary teachers to improve their knowledge of science subject matter and their understanding of pedagogy for teaching lab science to large classes.

Participants also reported that DL technologies might be used to strengthen and/or expand instruction in Foreign Languages(80.6% of participants), Visual Arts (72.7%), and Math (70.0%). The areas identified are generally those now emphasized in the core curriculum but for which materials and teacher training have been less readily available. For example, in most regions, participants note that, despite research findings favoring foreign language introduction in the elementary grades, limited school resources and the lack of elementary foreign language instructors make that unlikely without the aid of DL. Similarly, teachers and administrators note the relative lack of appropriate elementary level materials for teaching Visual Arts and teachers' general lack of training in these subject areas as justification for using DL technologies in these courses. As one teacher noted: *"When you are so far removed from more urbanized areas--and don't have quite the same access to free and volunteer resources available there--students just don't get the same exposure to the world of the arts and music and we haven't yet developed enough excellent curriculum materials in those areas."*

When asked about broader instructional applications, participant responses tended to mirror those on core priority checklists: Science, Foreign Languages, Social Studies, and Visual Arts appear as priority areas, along with Language Arts applications, particularly for listening skills and writing activities that might involve interactive exchanges among students at different school sites. In all regions, participants noted that at the elementary level, DL applications were primarily useful for expanding and enriching the core courses.

It is interesting to note that in sheer number of responses, core curriculum applications received top priority among workshop participants, but individual recommendations for DL applications cited areas beyond the core as possibly strongly benefitting from DL technology. A number of teachers in remote rural areas remarked on the usefulness of DL to introduce students to resources and experiences in more urbanized areas or in other geographical regions. As one teacher noted: *"I would love my fifth graders to be able to interact with--or even watch through Satellite--other students their age who are going on a field trip to a local business or to an arboretum or museum. We would also benefit from exchanges with students of different cultures and lifestyles. I fear students who grow up so far from more urban areas get no real sense of how varied our state--and our nation and world--are."* Some teachers also noted the potential counseling uses of DL by extending peer counseling programs from school to school or across districts. Upper elementary and middle school teachers and administrators, as well as parents of middle school-age students noted the benefits of allowing students to interact with peers in other areas of the state. As one parent commented: *"I think they might talk more openly about their troubles to students they don't see every day in school."*

The nature of elementary education precludes the use of Distance Learning technology as the sole source of instruction for any single subject. Participants felt that DL applications should be used to enhance or enrich instruction, not as a substitute for the classroom teacher. Unlike secondary schools where Distance Learning applications can offer intact courses such as AP Spanish or calculus by an offsite teacher, elementary schools necessitate the presence of a certified teacher who can use Distance Learning as a supplement to classroom instruction. Comments that represent this sentiment include:*"This technology is a wonderful supplement to our regular instruction, but it doesn't replace the classroom teacher as the primary instructor....Since elementary teachers are expected to teach every subject, DL can insure that we can be consistent in providing high quality instruction in all subject areas rather than in our few favorite areas....or areas in which we have most training ....or areas which we feel must receive most attention...I can imagine any number of ways DL technologies can allow me to teach large numbers of students without sacrificing individual attention. I can imagine some groups using DL applications with the help of an instructional assistant while I work individually or in small groups with others in my class....I think it's important to remember that, at the elementary level, the machines do not replace the teacher. ...and it's important that we do a good job of helping parents to understand this, too."*

Secondary Course Priorities

Table 4 displays participants' view on which secondary core courses would most benefit from DL applications and with which courses districts should begin if DL is adopted.

Table 4

Priority Secondary Instructional Areas:
Percent of Respondents who perceived Secondary Core Curriculum areas as "Useful" for DL Technology and who ranked as among the Top Ten Core areas to "Start with.'
(N=165)

	Useful (%)	Start With (%)
Calculus	73.9	37.6
Analytical Geometry	69.1	14.5
US History/AP	69.1	27.9
Trigonometry	67.3	14.5
AP Bio/Chem	66.1	33.3
Foreign Language	63.6	39.4
Physics	57.6	13.3
Writing	55.8	18.0
Economics	55.2	7.9
Listening	52.7	7.9

At the secondary level, participants generally rank advanced courses, especially in Math and Science, as those in which DL might best be applied. There is less consensus on the most applicable secondary course, however. The top ranked "useful" curriculum area, Calculus, (ranked useful by 73.9% of participants) is closely followed by Analytical Geometry (69.1%), US History/AP History (69.1%), Trigonometry (67.3%), AP Biology/Chemistry (66.1%), and Foreign Language (63.6%)--all falling within a close range. These courses tend to have smaller enrollments than more broadly subscribed and required courses in Language Arts and introductory level Science and Social Studies. Economies of scale suggest that districts would benefit from offering such advanced courses through use of DL to increase the number of students served by one teacher. Additionally, the relative scarcity of teachers trained to teach advanced courses in the Sciences, and Foreign Languages makes the use of DL more desirable in these courses. In small schools in particular, DL is the only means by which students can enroll in advanced level courses. Said one administrator: *"Even as we speak, I have students studying advanced biology who would not have this option without DL."*

When asked which courses should get DL priority, workshop participants expressed greater consensus. Foreign Languages (39.4%) ranked first, followed closely by Calculus (37.6%), AP Biology and Chemistry (33.3%)--all courses for which trained staff are relatively scarce and which generally attract fewer students per course. Because of the departmental structure of secondary schools, participants in general showed less agreement than their elementary counterparts here.

In discussions of broader instructional applications, secondary respondents noted DL's potential to help high schools provide college courses, adult education courses, and GED prepatory courses. The use of these technologies to enable home-bound students to keep abreast of school work was also noted. Additionally, administrators discussed the potential of DL to make available a complete curriculum for home-schooling students as a way to ensure comparably high quality education to students outside the domain of public schools. Unlike discussions of elementary participants, secondary respondents considered direct DL instructional applications to be viable additions to the curriculum. At this level, educators felt that students are able to learn through direct instruction provided through DL, so discussions centered on the extension and expansion of course offerings rather than enriching or supplementing existing courses as was the focus of the elementary level discussions. However, there is also the feeling that only very motivated students would be able to learn through a DL system. Some participants were pessimistic about any possibility of system use by "regular" students or by students with special needs.

Overall Ranking of Curriculum Priority Areas

To determine the ten K-12 curriculum areas that participants consider the most appropriate for DL applications we have calculated an overall ranking of course priorities. This tally is meant to provide direction to district administrators, school board members, Regional Service Center staff, and USOE staff who select courses from among the range of K-12 instructional applications for initial DL applications. Table 5 reports the comparative ranking of course priorities that might benefit from DL.

Table 5

Instructional Priorities (K-12):
Total Number and Percent of Responses[1] Indicating
Effective Instructional Applications of DL Technology

	N	%
Math	229	20.8
Science	190	17.3
Foreign Language	135	12.3
Social Studies	127	11.5
Visual Arts	106	9.6
Language Arts	80	7.3
AP/Gifted & Talented[2]	50	4.5
Info Technology	46	4.2
Healthy Lifestyles	30	2.7
Vocational Ed.	14	1.3
Other	93	8.4

[1] N and percent calculations are based on all responses for Instructional applications sorted into categories shown.

[2] AP refers to Advance Placement courses at the secondary level, Gifted and Talented refers to enrichment activities for accelerated students at the elementary level.

As Table 5 indicates, Math , Science, Foreign Language, Social Studies, and Visual Arts are the instructional areas in which DL technology is perceived to be most useful by all participants. This listing generally confirms the top priorities that surface in the individual elementary and secondary listings. It is important to note that Healthy Lifestyles, an elementary core course, ranks in the top ten priority areas. Elementary teachers in particular noted concerns over teaching sensitive health-related topics such as drug and alcohol prevention and AIDS awareness. Many felt that DL would help to ensure a consistent and balanced curriculum both within the district and throughout the state and, as noted later in this report, would allow teachers to participate in televised professional development courses aimed at providing the most recent research and most appropriate instructional strategies for such sensitive topics. Administrators and parents also saw a potential here for informing parents about these issues as well.

In the discussion groups, participants frequently cited Vocational Education applications of DL, although that area was not highly ranked in the core listings. Comments

centered on two needs: to provide expanded course offerings to remote areas and to assist schools unable to hire the wide range of technical experts needed to provide a well-rounded Vocational Education program. Adult as well as student benefits from these offerings were discussed. Data on instructional applications of DL technologies by role group are displayed in Appendix E.

Staff Training and Assistance

Data for DL applications in staff training and assistance across all regions and role types, are displayed in Table 6.

Table 6

Staff Training Priorities:
Total Number and Percent of Responses[1] Indicating Effective Staff Training Applications of DL Technology

	N	%
Teach w/ Technology	195	32.0
Inservice	138	22.7
Operate Equipment	55	9.0
Adv. Courses/Degrees Recertification	54	8.4
Share Research Findings and Ideas	36	5.9
Train Support Staff	30	4.9
Coordinate Meetings	25	4.1
Manage/Discussions	18	3.0
Train Beginning Teachers	12	2.0
Train Admin. Staff	11	1.8
Demonstrations by Experts	9	1.5
Improve Morale	9	1.5

[1] Percent calculations are based on all responses for Staff Training N and applications sorted into categories shown

Clearly many respondents (32.0%) see a need for training teachers to teach with DL technology, i.e., to use appropriate lessons and engage distant students. In discussion groups, teachers, administrators and school board members note teachers' general

reluctance to use technology for instructional purposes. They recommend technology training as a way for teachers to upgrade their professional skills, subject matter knowledge, and instructional pedagogy.

Teachers not only need training to use the technology, but also to adapt it to their own students' needs. As one elementary teacher put it, *"In order to use DL in the elementary school, you've got to soften the edge of this kind of technology and balance it with the environment in which it is delivered."*

The general inservice category—ranked the second most appropriate (22%) for DL covers a wide variety of possible applications. A few examples: training for instructional aides; training for disciplinary procedures; tutoring techniques; instructional approaches for potentially sensitive subject areas such as family living courses, AIDS curriculum; broadening training for mentor teachers. Considering such professional development applications, one principal noted: *"I have been thinking that DL applies to schools that are far from one another. Now I realize that distance may simply mean distance from one classroom to another in one school. I would love to able to hold school-wide meetings or grade level meetings while allowing teachers to remain in their classrooms. For that matter, I could use lead teachers and instructional aides to teach [special subjects like Science or Art or Music]. This would allow me to give other teachers extra preparation time."* [This comment refers to the general lack of preparation time provided for elementary teachers.]

Other types of staff training discussed included training in equipment operation (9.0%), advanced courses for degrees or recertification (8.4%), and training for support and administrative staff. Elementary principals and teachers, in particular, list support staff training. Many groups also noted possible uses for training parents and community volunteers. As one district administrator commented: *"I would be relieved if I thought all of our parent volunteers had some orientation to our expectations of volunteering throughout schools in our district."* Other groups discussed administrative applications of DL, along with its usefulness for general management meetings—within schools for grade level or all staff discussions, between schools within a district or region, and for statewide sharing information.

Administrative Applications of Distance Learning Technologies

Table 7 displays administrative use data across all regions and role groups. Nearly half of all respondents (47.6%) would use DL technology for meetings of all kinds. Discussions indicate that administrative uses include within-district meetings as well as regional and statewide meetings. Participants broadly support the use of DL technology to reduce the expense and travel required by district, regional and statewide meetings, even as they recognize that there are times when face-to-face meetings are necessary. *As one administrator observed: "One of the problems for us [in rural areas] is that we are often called away to attend meetings. It leaves little time to act as instructional leader of the school. A lot of times we can meet through teleconferencing."*

Table 7

Administrative Priorities:
Total Number and Percent of Responses[1] Indicating Effective Administrative Applications of DL Technology

	N	%
Meetings	159	47.6
Training	79	23.7
Student Records	34	10.2
Improve Communications	30	9.0
Teacher Evaluation	23	6.9
Supplies	8	2.4
Other	2	0.6

[1] N and percent calculations are based on all responses for administrative applications sorted into categories shown.

As for the responses for staff training, the training category of this group of responses (23.7%) includes any number of staff development activities for administrators, teachers, and other school staff, (e.g., budget specialist, secretaries, custodians, and maintenance personnel). This category was the second most prevalent administrative application of technology. Slightly over 10% of the responses suggested student recordkeeping and transmission of that data as possible uses for DL technology. Another 9% suggested that DL technology could improve communications within districts, as well as across the state. Across role types (See Appendix G), there is considerable consistency in perceptions of administrative applications except in the following cases: teachers and administrators from both elementary and secondary schools feel most strongly that DL technology should help reduce the number of meetings they needed to attend. Parents in general tend to emphasize training more than other groups do. And secondary teachers in large numbers support the use of DL technology for recordkeeping, perhaps reflecting the extensive recordkeeping requirements for counseling and grading at this level.

Preferred Distance Learning Application

Table 8 summarizes participant thoughts about which of the four technologies presented might be most useful in addressing particular needs.

Table 8

Total Number and Percent of Responses[1] Indicating Preferred DL Technology for Instructional, Staff Training, and Administrative Applications

	Instruction		Staff Training		Administrative		All	
	N	%	N	%	N	%	N	%
Duplex	286	46.9	141	47.5	107	51.9	534	48.0
Audiographics	112	18.4	48	16.2	25	12.1	185	16.6
Simplex	95	15.6	54	18.2	39	18.9	188	16.9
Satellite	58	9.5	20	6.7	15	7.3	93	8.4
Other	59	9.7	34	11.4	20	9.7	113	10.2

[1] N and Percent calculations are based on all responses for preferred DL Technology

Throughout the state, Duplex technology--i.e., real-time, two-way video and audio technology--is favored by a margin of 3 to 1 over Audiographic and Simplex technologies. Educators and parents alike however recognize that duplex may be too expensive.

Most respondents were unable to match a particular technology to a particular instructional, staff training, or administrative application. One parent commented: *"I think we should decide in general whether or not to invest in DL, but the experts at the school and the district are the ones who have to determine exactly which kinds of equipment we need."* Nevertheless, in discussions, participants are able to discriminate among the four uses to some extent. For example, Audiographics is generally favored for Math as well as some kinds of Science applications. For exposure to social and cultural events and issues, Satellite transmissions accompanied by well-developed teacher guides received favorable comments from teachers. Still, less than 20% of respondents overall favor Simplex and Audiographic technologies.

Satellite and other technologies each received approximately 10% preference. Other technologies cited include teleconferencing, FAX machines, VCRs, video-disks, and computer networking. Appendices H, I, and J contain data on preferred DL technology by role group. The preference for Duplex technology is evident in all role groups and across all application areas but particularly for administrative uses of DL technology. This reflects preferences for teleconferencing and other interactive meeting uses.

It should be noted that participants had varying degrees of knowledge and understanding about DL technology. Some participants knew only what they'd learned in the morning presentations and afternoon discussions. Others had hands-on knowledge and several years' experience working with a DL system. These participants helped call attention to particular DL technology strengths and shortcomings.

Obstacles to Implementing Distance Learning Technologies

Potential obstacles in implementing DL technologies are cost, changing ingrained attitudes and teaching practices, and developing adequate training both in the operation of the equipment and in preparing lessons appropriate for transmission through DL technology. Table 9 displays responses to questions about implementation obstacles.

Table 9

Total Number and Percent of Responses[1] Indicating Obstacles to Implementing DL Technology

	Instruction		Staff Training		Administrative		All	
	N	%	N	%	N	%	N	%
Cost	146	33.2	101	30.1	76	43.9	323	34.0
Attitude (Students, Teacher, Admins.)	82	18.6	71	21.1	42	24.3	195	20.5
Attitude (Parents, Community)	7	1.6	6	1.8	9	5.2	22	2.3
Teacher Training	136	30.9	40	11.9	18	10.4	194	20.4
Space/Facilities	12	2.7	6	1.8	4	2.3	22	2.3
Scheduling	2	0.5	16	4.8	10	5.8	28	3.0
Equipment	16	3.6	29	8.6	7	4.0	52	5.5
Coordination/ Collaboration	12	2.7	15	4.5	-	-	27	2.8
Technology Expertise	16	3.6	39	11.6	6	3.5	61	6.4
Determine Need	7	1.6	13	3.9	-	-	20	2.1
Other	4	0.9	-	-	1	0.5	5	0.5

[1] N and percent calculations are based on all responses for obstacles sorted into categories shown.

Cost is considered the greatest obstacle by all role groups. Overall, 34.0% of responses mentioned cost. A major problems was justifying the high start-up and maintenance costs of most of the technologies when teachers, principals, and parents are concerned about generally limited funds available to support basic education programs. A teacher captures this sentiment: *"I don't have enough textbooks and science equipment to conduct my regular class. It's hard to imagine that [the district] would pay for these fancy technologies before paying for basic needs."* And a parent notes: *"My children's school doesn't have an adequate library. I would want to be sure we had invested in books before machines."*

Another issue concerns cost effectiveness. How do you invest in expensive technical delivery systems without knowing whether or not they actually improve productivity? A high school principal commented: *"I see that we can do these things, but I've also seen a lot of students who appear not to be on task in the DL class. Until we know better how to do this, I would invest in other enrichment activities."* An elementary teacher voices a similar concern: *"I want my students to have the best learning activities possible. Maybe DL can do that, but so far the successful programs are at the high school level. I want to know how it works with elementary students."*

Training teachers to teach with the system (20.4%) and changing teachers, administrators and parents attitudes (over 20%) are second to cost in order of concern. Respondents mentioned teacher reluctance to change long-established instructional methods, and the lack of programs to help teachers tailor lessons to DL needs. The attitude obstacle was expressed in a number of ways: "technophobia", schools' resistance to change, convincing students, teachers, and administrators that technology works, and dealing with teacher fears that they might be replaced by technology. Some parents cited concerns that learning would be de-humanized. *"I hate to see my child being taught primarily by machines,"* said one parent . Elementary parents, in particular, were more hesitant about extensive use of technology and feared children might spend less time with a certified teacher. But administrators who have used DL technology pointed out that when parents came to the school and saw that students are not just "watching TV" they stopped worrying. They discovered that students can learn from technology and from one another.

Secondary teachers though less concerned about the "de-humanization" of teaching, were more concerned about the kinds of learners to assign to DL classes. One high school teacher expressed frustration about equity of access. *"I hear people say that technology can help our at-risks students. But most of what's available are for self-directed and motivated students in advanced classes."*

Other obstacles include: Space and facilities concerns centered on uncertainties about where to place transmittal studios, and how to equip classes for DL technology; class scheduling problems between the sending and receiving sites; purchase of the right kinds of equipment and maintenance of that equipment; expertise in the schools to train teachers and troubleshoot when equipment breaks down. Appendices K, L, and M provide detailed breakdowns of implementation obstacles by role groups.

How to Fund Distance Learning Applications

School board members, district level administrators, and elementary and secondary administrators were asked where they might find funds to support DL programs for instruction, staff training, and administrative uses. Table 10 summarizes the findings across the three topical areas.

Table 10

Total Number and Percent of Responses[1] Indicating Preferred Sources of Funding for DL Technology Applications

	Instruction		Staff Training		Administrative		All	
	N	%	N	%	N	%	N	%
Grants	48	42.5	45	57.7	36	62.1	129	51.8
Business Partnership	24	21.1	18	23.1	10	17.2	52	20.9
Legislature	16	14.2	5	6.4	1	1.7	22	8.8
District Funds	9	8.0	9	11.5	9	15.5	27	10.8
Fee fro Service	3	2.7	1.	1.3	-	-	4	1.6
Donations	6	5.3	-	-	1	1.7	7	2.8
Other	7	6.2	-	-	1	1.7	8	3.2

[1] N and percent calculations are based on all responses for Funding Sources sorted into categories shown

Grants from foundations, the state government, or the federal government are by far the most commonly suggested sources of potential funding. Over half of the respondents (51.8%) cited grants as most promising. Business and education partnerships are mentioned by 20.9% followed by district sources (in-kind support as well as reallocation of resources) and legislative action (8.8%). Overall, respondents were clear that outside funding is essential if DL technology is to be implemented in the schools. Furthermore, funding must have two components 1) an initial investment for equipment, training, and public relations; and 2) sustained support for operation and maintenance costs. This general response pattern emphasizing outside funding is prevalent in all role groups (See Appendix N, O, and P).

Participants' Rating of the Usefulness of the Regional Meetings

Participants at all seven regional meetings were asked to provide FWL with feedback about various aspects of the workshop (See Appendix Q). Table 11 reports the mean ratings by region.

Table 11

Mean Evaluation Ratings[1] of Usefulness of
Workshop Activities by Participants by Region
(N=204)

Activities	Region[2] 1	2	3	4	5	6	7	Total
Distance Learning Overview	n/a	3.6	3.2	3.6	3.5	3.6	3.7	3.5
Audiographic DL Model	n/a	3.2	3.1	3.3	3.0	3.1	3.2	3.2
Simplex TV DL Model	n/a	3.0	2.8	3.1	3.0	3.0	3.2	3.0
Duplex DL Model	n/a	3.3	3.1	3.4	3.7	3.1	3.6	3.4
Satellite DL	n/a	3.1	3.0	3.2	3.1	3.3	3.3	3.1
Group Discussion	n/a	3.1	3.3	3.6	3.4	3.9	3.7	3.4
Total	n/a	3.2	3.1	3.4	3.3	3.3	3.5	3.3

[1] 1 = of little use; 2 = somewhat useful; 3 = useful; 4 = very useful

[2] Region 1. Southeastern Education Service Center Region, 2. Utah Valley Region, 3. Salt Lake Region 4. Northern Utah Region, 5. Southwest Educational Development Center Region, 6. Central Utah Educational Services Region, 7. Northeastern Utah Educational Services Region

The DL Overview of USOE's Technology Task Force was rated the most useful activity for the day (x=3.5; 1 = of little use to 4 = very useful). The presentation on the Duplex system as well as the afternoon discussion groups were also highly rated (x=3.4). All other ratings were slightly above the "useful" rating (x=3.0 to 3.2). Table 12 displays the breakdown of the evaluation data by role group. Differences among groups were small. Elementary and secondary administrators and elementary teachers tended to rate the meetings and slightly more useful than other role groups. Board members and district level administrators gave the lowest ratings. Group facilitators who observed the afternoon sessions tended to corroborate these ratings.

Table 12

Mean Evaluation Ratings of Usefulness
of Workshop Activities by Participants by Role
(N=204)

Activities	Role[2] 1	2	3	4	5	6	7	8	9	10	Total
Distance Learning Overview	3.0	3.1	3.5	3.5	3.6	3.5	3.7	3.6	3.0	3.1	3.5
Audiographic DL Model	2.7	2.9	3.2	3.1	3.4	3.2	2.9	3.1	3.0	3.0	3.2
Simplex TV DL Model	2.3	2.6	3.1	3.1	3.3	2.9	3.0	3.0	2.0	3.0	3.0
Duplex DL Model	2.3	3.2	3.5	3.7	3.5	3.3	3.1	3.4	3.0	3.1	3.4
Satellite DL	3.0	2.9	3.2	3.0	3.3	3.1	2.8	3.1	3.0	2.9	3.1
Group Discussion	2.3	2.9	3.7	3.7	3.5	2.6	3.6	3.3	3.0	3.0	3.4
Total	2.6	2.9	3.4	3.4	3.4	3.1	3.2	3.3	2.8	3.0	3.3

[1] 1 = of little use; 2 = somewhat useful; 3 = useful; 4 = very useful

[2] Role 1. Board member, 2. District Level Administrator, 3. Elementary School Administrator, 4. Secondary School Administrator, 5. Elementary Teacher, 6. Secondary Teacher, 7. Elementary Parent, 8. Secondary Parent, 9. Post Secondary Representative, 10. Other

Overall, participants were pleased with the presentations and the group discussion. They felt that they gained deeper understanding about DL technology. They also appreciated the opportunity to contribute to the planning process and to discuss technology implementation issues with their colleagues. Most participants deeply appreciated being part of the process of determining the future of DL technology in the classroom.

TECHNOLOGY CAPACITY FINDINGS

Table 13 displays the results of the technology equipment inventory across regions in the state.

Table 13
Summary of Technology Equipment and Capacity by Region

Region and State Totals	SESC	UV	SL	NU	SWDC	CUES	NUES	TOTALS
TV BROADCAST RECEIVING/VIEWING EQUIPMENT								
Television monitors (will work with a VCR)	129	996	3490	831	334	98	279	**6157**
Video tape recorders	123	651	2115	586	219	116	187	**3997**
Other television sets or receivers	18	132	745	254	52	38	223	**1462**
Schools with internal video distribution systems	8	20	88	14	2	13	29	**174**
Schools with access to a satellite reception	5		31	5	4	4	11	**60**
Schools w/ classroom modified for AV use	8		48	11	3	11	11	**92**
TELEVISION/VIDEO PRODUCTION EQUIPMENT								
Portable video camera and VCR w/ needed accessories	16	89	261	119	37	23	43	**598**
Video production studios	3	1	5	4		2	6	**21**
VIDEO TRANSMISSION CAPACITY								
Video modulators/demodulators	9		14	29		1	2	**55**
Microwave transmitting and/or repeater sites	7						1	**8**
Low power broadcast facilities						1		**1**
Use arrangements with cable companies	3	1	2	1	1	3	4	**15**
District owned cable distribution systems						1		**1**
District owned fiber distribution systems	3							**3**
DATA AND VOICE TRANSMISSION CAPABILITY								
Telephone circuits to a classroom	14	47	60	47	4	16	12	**200**
Video delivery systems w/ data capacity	6	2	22	11	1	3	10	**55**
Telephone circuit numbers leased for DL use			1		2	2	5	**10**

Region and State Totals (Table 13 cont.)

	SESC	UV	SL	NU	SWDC	CUES	NUES	TOTALS
DATA TRANSMITTING/RECEIVING EQUIPMENT								
Modems capable of data transmission only	16	77	110	66	82	32	34	**387**
Modems capable of data and voice transmission	4	4	7	7	5	4	18	**49**
Fax machines	7	1	6	7	3	3	8	**35**
AUDIO TRANSMITTING/RECEIVING EQUIPMENT								
Classrooms equipped with amplifier and speakers	9	29	24	22	19	3	6	**112**
Telephone speaker boxes	1	19		12	60	35	21	**148**
Micro/mixer/amplifier voice pickup systems	32	95		103	44	32	11	**317**
GRAPHICS CREATING EQUIPMENT								
Apple IIe, GS format computers	571	1726	3033	2450	1079	339	620	**9818**
Macintosh computers	62	220	392	171	60	90	103	**1098**
IBM PC, XT format computers	118	719	1576	658	61	35	167	**3334**
IBM AT, 386 format computers	1	22	350	45	40	3	1	**462**
Light pens for computer graphics creation	1	3	15	7	8	2	5	**41**
Digitized drawing pads for computer graphics	3	25	69	16	6	5	11	**135**
Mouse(s) for computer graphics	465	366	771	305	143	227	94	**2371**
Slow scan camera/scanning units		2	22	8	3	2	1	**38**
OTHER SUPPORT EQUIPMENT								
Professional audio tape player/recorders	6	250	1561	305	10	11	40	**2183**
Video disk players	2	13	50	75		11	13	**164**
Video projectors (for enlargement)		9	65	26	7	1	8	**116**
Printers for computers	362	981	2565	1203	744	242	588	**6685**
Photocopy machines (accessible to teachers)	41	172	546	198	109	40	86	**1192**

Several points are noteworthy from Table 13.

o There is a large inventory of video equipment: monitors, VCRs, and receivers. It suggests that many schools in the state now have the capacity for video tape and state-distributed instructional television programming.

o Satellite reception capacity is somewhat limited. Throughout the state, only 60 schools of nearly 900 have access to a down-linking dish.

o The collaborative formed by USOE, University of Utah, NUES, and CUES has made the Simplex technology accessible to all high schools in the state. However, reported use of that technology appears to be limited.

o Computers are the most prevalent type of technology hardware in the state. There are about 15,000 computers in the schools. About two-thirds of the computers are Apples (IIs, IIes, and GSs); the remainder are IBMs or IBM compatibles. Many schools have various computer accessories.

o There are nearly 7,000 printers in the schools, almost one printer for every two computers. Since one printer can service more than one computer, networking computers to printers appears to be under-utilized.

o There are nearly 400 modems in the state, almost all of them in high schools. Informal conversations with district users suggests that these modems are used to transmit student records for the Student Information Services file, and are not available for instructional use.

o There are limited numbers of FAX machines (35), video disk players (164), and video enlargement projectors (116) in the state. Most of the video disk players are localized in the northern Utah and the Salt Lake Valley areas.

o Relatively few schools are currently equipped to incorporate any type of DL technology. Telephone circuits for Audiographic and Simplex technology are available in 189 classrooms; three-fourths of them are in urban districts. About one school in ten has a classroom equipped with amplifier/speaker capability, equipment necessary for larger group instruction. Ninety-two classrooms are modified for audio-visual transmissions; however more than half of these classrooms are concentrated in districts in the Salt Lake area.

o Throughout the state, the DL systems that are currently in use include the following:

Duplex Television -	San Juan School District (4 schools)
	Carbon School District (2 schools)
	Daggett School District (1 school)
Simplex Television -	Cache School District (1 school)*
	Logan School District (1 school)
	Wayne School District (1 school)
	North Sanpete School District (1 school)
	Juab School District (1 school)
	Duchesne School District (5 schools)
	(*satellite simplex system)

Audiographic - Wasatch School District (1 school)
Rich School District (1 school)
Millard School District (2 schools)
Tintic School District (2 schools)
Jordan School District (4 schools)
Box Elder School District (4 schools)

The distribution of technology equipment within each of the seven regions is presented in Regional Reports.

SUMMARY OF FINDINGS

o Science, Math, and Foreign Language classes at the elementary level and advanced placement classes and Foreign Language classes at the secondary level would benefit most from DL Technology. At the elementary level, the application is in enhancing and enriching instruction. At the secondary level, direct instruction is acceptable for classes that enroll fewer students or require teacher specialists.

o Training teachers to teach with technology and use it as a tool to improve instruction as opposed to using technology as a substitute was the most salient staff development need.

o DL Technology can be used effectively, in many instances, to take the place of face-to face-meetings, thereby reducing staff travel time and expense and allowing them to stay in the school/district to attend to its needs.

o Duplex Technology was preferred by a large proportion of participants over the Simplex and Audiographic technologies. However, it was also recognized as the most costly and therefore impractical for most schools. Satellite technology was the least preferred.

o DL Technologies which include features for interaction between teacher and students were preferred.

o Cost, in terms of initial capital outlay and training as well as ongoing operating and maintenance expenses, was a major concern. Justification for this investment in terms of need and efficacy is needed.

o External sources of funding are essential to support the implementation of DL Technology. Schools cannot absorb DL costs without near total external financial support.

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Appendix A

DISTANCE LEARNING NEEDS ASSESSMENT
AGENDA OF EVENTS

9:00 am		Fill out Registration/Information Sheet
9:15 am		Introduction to distance learning --definitions, categories, and overview (Dale Steadman, Utah State Office of Education)
		Presentation and discussion of various models
9:45 am	1.	NUES audio/graphics distance learning model (George Miller, Uintah Basin AVC)
10:15 am	2.	CUES simplex television distance learning model (Harold Shaw, Central Utah Education Services)
10:45 am	BREAK	
11:00 am	3.	Carbon District duplex television distance learning model (Foster Lott, Carbon School District)
11:30 am	4.	Satellite distance learning (Doug Jones, U of U Learning Services)
12:00 noon	LUNCH	
1:00 pm		Individual break-out groups for data gathering (Location to be announced)

Appendix B

Core Curriculum

_____
role/location

Directions: The following are lists of elementary and Secondary CORE curriculum areas. 1) Check the subjects in which Distance Learning Technologies may be a useful tool. 2) If you were implementing this in your school/district, which course that you checked would you offer first (1), second(2), third(3), fourth(4), fifth (5)? Place the numbers on the blanks on the right.

Elementary Core Curriculum

Distance Learning is useful		I would start with
	Language Arts	
____	Reading	____
____	Writing	____
____	Speaking	____
____	Listening	____
____	**Mathematics**	____
____	**Science**	____
	Social Studies	
____	Introductory Citizenship	____
____	Principles and Practices	
	Arts	
____	Visual Arts	____
____	Music	____
____	Dance	____
____	Drama	____
____	**Healthy Lifestyles**	____
	Information Technology	
____	Awareness I	____
____	Awareness II	____
____	**Foreign Language**	____

Secondary Core Curriculum

Distance Learning is useful		I would start with
	Language Arts	
____	Thinking	____
____	Reading	____
____	Writing	____
____	Speaking	____
____	Listening	____
	Math	
____	Math in Living	____
____	Math in Careers	____
____	Algebra	____
____	Geometry	____
____	Trigonometry	____
____	Analytic Geometry	____
____	Calculus	____
	Science	
____	Earth/Space	____
____	Life	____
____	Physical	____
____	Biology	____
____	Chemistry	____
____	Physics	____
____	AP Biology, Chemistry	____
	Social Studies	
____	US or AP American History	____
____	Ancient World Civilizations	____
____	Modern World Civilizations	____
____	European History	____
____	World Cultural Geography	____
____	Psychology	____
____	Sociology	____
____	Economics	____
____	U.S. Government	____
	Arts	
____	Music Appreciation	____
____	Music Theory	____
____	Dance	____
____	Theater/Drama	____
____	Visual Arts	____
	Healthy Lifestyles	
____	Fitness	____
____	Consumer Health	____
____	Team Sports	____
____	Personal Health	____
	Information Technology	
____	Awareness	____
____	Utilization	____
____	Specialization	____
____	**Vocational Education**	____
____	**Foreign Language**	____

Appendix C

Technology Inventory

Distance Learning Technology Inventory
Form A

Name:_____ Position:_____

District:_____

Part One

Part one of the inventory is to determine what equipment or technology presently exists in your district. Please enter the number of units for the following types of equipment, systems, or sites. Do **not** use a check or write a "yes" or "no" response. Out-of-date or non operational equipment should NOT be listed.

TELEVISION BROADCAST RECEIVING/VIEWING EQUIPMENT	# OF UNITS
Television monitors (will work with a VCR)	
Video tape recorders	
Other Television sets or receivers	
Number of schools with video distribution systems (Classrooms are connected by coaxial cable)	
Number of schools with access to a satellite dish and receiver	
Number of schools w/ classroom modified for video/audio use	

TELEVISION/VIDEO PRODUCTION EQUIPMENT	# OF UNITS
Portable video camera and VCR w/ needed accessories	
Number of video production studios w/ switchers, sound recording and editing equipment	

VIDEO TRANSMISSION CAPACITY	# OF UNITS
Video modulators/demodulators	
Number of microwave transmitting and/or repeater sites	
Number of ITFS (low power) broadcast facilities/equipment	
Number of working arrangements with cable companies for usage of a channel	
Number of district owned cable distribution systems	
Number of district owned fiber distribution systems	

Form A Continued

DATA AND VOICE TRANSMISSION CAPABILITY	# OF UNITS
Number of telephone lines/curcuits to a classroom (not an extension phone from the office)	
Number of video delivery systems w/ data transmission capacity	
Number of eight-hundred telephone numbers leased for distance earning use	

DATA TRANSMITTING/RECEIVING EQUIPMENT	# OF UNITS
Modems used for data transmission only	
Modems capable of data and voice transmission	
Fax machines	

AUDIO TRANSMITTING/RECEIVING EQUIPMENT	# OF UNITS
Number of classrooms equipped with amplifier and speakers	
Telephone speaker boxes	
Number of mike/mixer/amplifier voice pickup systems	

GRAPHICS CREATING EQUIPMENT	# OF UNITS
Apple IIe. GS format computers	
Macintosh computers	
IBM PC. XT format computers	
IBM AT. 386 format computers	
Light pens for computer graphics creation	
Digitized drawing pads for computer graphics	
Mouse(s) for computer graphics	
Slow scan camera/scanning units	

OTHER SUPPORT EQUIPMENT	# OF UNITS
Professional audio tape player/recorders	
Video disk players	
Video projectors (for enlargement)	
Printers for computers	
Photo copy machines (accessible to teachers)	

Please return completed form to : Far West Laboratory for Educational Research and Development (Attention: Dean Bradshaw), 1855 Folsom St., San Francisco, CA 94103

Part Two

Part two of the questionnaire is to determine what distance learning use is being made of equipment you possess. Please fill in as accurately as you can the information requested within each of the seven columns. Remember, this information requested relates only to courses that are transmitted live to students physically separated from the tele-teacher. The first two rows are filled in as an example.

1	2	3	4	5	6	7
Courses/Subjects you originate/produce	Courses/Subjects you receive and use	Delivery System used (Two-way TV, one-way,audiographics)	Transmission Method (Broadcast,cable, ITFS, fiber, phone line, microwave)	Class Period	Grade Level	Total Time of Class
NUMBER TOTAL____	NUMBER TOTAL____				TOTAL HOURS PER DAY_____	

EDAAC#SOE 03-2524-08
Date 3/14/89

Distance Learning Technology Inventory
Form B

Name:_____ Position:_____

District:_____

The purpose of this inventory is to determine what equipment or technology exists in your district. Please enter the number of units for the following types of equipment, systems, or site. Do **not** use a check or write a "yes" or "no" response. Out-of-date or non operational equipment should NOT be listed.

TELEVISION BROADCAST RECEIVING/VIEWING EQUIPMENT	# OF UNITS
Number of schools with video distribution systems (Classrooms are connected by coaxial cable)	
Number of schools with access to a satellite dish and receiver	
Number of schools w/ classroom modified for video/audio use	

TELEVISION/VIDEO PRODUCTION EQUIPMENT	# OF UNITS
Number of video production studios w/ switchers, sound recording and editing equipment	

VIDEO TRANSMISSION CAPACITY	# OF UNITS
Number of microwave transmitting and/or repeater sites	
Number of ITFS (low power) broadcast facilities/equipment	
Number of working arrangements with cable companies for usage of a channel	
Number of district owned cable distribution systems	
Number of district owned fiber distribution systems	

DATA AND VOICE TRANSMISSION CAPABILITY	# OF UNITS
Number of eight-hundred telephone numbers leased for distance learning use	

Please return completed form to : Far West Laboratory for Educational Research and Development (Attention: Dean Bradshaw), 1855 Folsom St., San Francisco, CA 94103

Distance Learning Technology Inventory
Form C

Name:_____ Position:_____

School:_____

Part One

Part one of the inventory is to determine what equipment or technology exists in your school. Please enter the number of units for the following types of equipment, systems, or site. Do **not** use a check or write a "yes" or "no" response. Out-of-date or non operational equipment should NOT be listed.

TELEVISION BROADCAST RECEIVING/VIEWING EQUIPMENT	# OF UNITS
Television monitors (will work with a VCR)	
Video tape recorders	
Other Television sets or receivers	

TELEVISION/VIDEO PRODUCTION EQUIPMENT	# OF UNITS
Portable video camera and VCR w/ needed accessories	

VIDEO TRANSMISSION	# OF UNITS
Video modulators/demodulators	

DATA AND VOICE TRANSMISSION CAPABILITY	# OF UNITS
Number of telephone lines/curcuits to a classroom (not an extension phone from the office)	
Number of video delivery systems w/ data transmission capacity	

DATA TRANSMITTING/RECEIVING EQUIPMENT	# OF UNITS
Modems used for data transmission only	
Modems capable of data and voice transmission	
Fax machines	

AUDIO TRANSMITTING/RECEIVING EQUIPMENT	# OF UNITS
Number of classrooms equipped with amplifier and speakers	
Telephone speaker boxes	
Number of mike/mixer/amplifier voice pickup systems	

Form C Continued

GRAPHICS CREATING EQUIPMENT	# OF UNITS
Apple IIe, GS format computers	
Macintosh computers	
IBM PC, XT format computers	
IBM AT, 386 format computers	
Light pens for computer graphics creation	
Digitized drawing pads for computer graphics	
Mouse(s) for computer graphics	
Slow scan camera/scanning units	

OTHER SUPPORT EQUIPMENT	# OF UNITS
Professional audio tape player/recorders	
Video disk players	
Video projectors (for enlargement)	
Printers for computers	
Photo copy machines (accessible to teachers)	

Please return completed form to : Far West Laboratory for Educational Research and Development (Attention: Dean Bradshaw), 1855 Folsom St., San Francisco, CA 94103

Part Two

Part two of the questionnaire is to determine what distance learning use is being made of equipment you possess. Please fill in as accurately as you can the information requested within each of the seven columns. Remember, this information requested relates only to courses that are transmitted live to students physically separated from the tele-teacher. The first two rows are filled in as an example.

1 Courses/Subjects you originate/produce	2 Courses/Subjects you receive and use	3 Delivery System used (Two-way TV, one-way, audiographics)	4 Transmission Method (Broadcast, cable, ITFS, fiber, phone line, microwave)	5 Class Period	6 Grade Level	7 Total Time of Class
French		Audiographics	Telephone Lines	5	12	50 min
	AP English		Broadcast	3	12	50 min
NUMBER TOTAL____	NUMBER TOTAL____				TOTAL HOURS PER DAY_____	

Appendix D

Discussion Guide

role/location

DISCUSSION GUIDE

We will be discussing potential technology applications in the areas of:

(1) Instructional Services to Students
(2) Staff Training and Assistance
(3) Administrative Uses.

For each of these areas, we will be engaged in a guided discussion on specific applications, on the most appropriate technologies, and on what is needed to use that technology effectively.

role/location

I. Instructional Services to Students

1. What do you think might be the five (5) instructional areas in which distance learning technologies can be an effective tool in your school/district. (Be specific: identify grade level, and subject area)

2. From what you know about distance learning technologies, which appear to be most appropriate for each of the five (5) instructional areas listed above?

3. From your perspective, what obstacles need to be overcome in order to use these distance learning technologies effectively in your school/district?

4. What are your thoughts about how to pay for the technologies you discuss above?

role/location

II. Staff Training and Assistance

1. What do you think might be the five (5) Staff Training and Assistance areas in which distance learning technologies can be an effective tool in your school/district. (Be specific: identify type of staff and nature of training)

2. From what you know about distance learning technologies, which appear to be most appropriate for each of the five (5) training need areas listed above?

3. From your perspective, what obstacles need to be overcome in order to use these distance learning technologies effectively in your school/district?

4. What are your thoughts about how to pay for the technologies you discuss above?

role/location

III. Administrative Uses

1. What do you think might be the five (5) Administrative Uses in which distance learning techniques can be an effective tool in your school/district. Be specific.

2. From what you know about distance learning technologies, which appear to be most appropriate for each of the five (5) administrative needs listed above?

3. From your perspective, what obstacles need to be overcome in order to use these distance learning technologies effectively in your school/district?

4. What are your thoughts about how to pay for the technologies you discuss above?

Appendix E

Percent of Responses Indicating Effective
Instructional Applications of DL Technology by Role

Course	1 N=19	2 N=85	3 N=79	4 N=127	5 N=200	6 N=264	7 N=48	8 N=159	9	10 N=41
Science	15.8	15.3	15.2	17.3	20.0	21.6	16.7	17.0	-	19.5
Math	10.5	15.3	12.7	18.1	10.5	22.0	10.4	18.9	-	19.5
For. Lang	15.8	20.0	6.3	15.7	15.0	9.5	16.7	15.1	-	7.3
Soc. Studies	21.1	5.9	11.4	10.2	20.0	14.0.	10.4	13.8	-	9.8
Lang. Arts	-	7.1	10.1	9.4	10.0	6.4	8.3	5.7	-	9.8
Arts	5.3	9.4	16.5	6.3	17.5	8.3	6.3	9.4	-	2.4
Info. Tech	-	5.9	7.6	1.6	6.5	4.5	6.3	1.9	-	4.9
Health Life	5.3	1.2	6.3	2.4	2.5	3.4	8.3	1.3	-	-
Any AP	5.3	3.5	1.3	4.7	1.0	1.9	-	1.9	-	4.9
Gifted and Talented	5.3	-	3.8	1.6	1.0	0.4	8.3	1.9	-	2.4
Voc. Ed.	-	8.2	-	0.8	-	1.1	-	1.3	-	2.4
Other	1.6	8.2	8.9	11.8	6.0	6.8	8.3	11.9	-	17.1

Appendix F

Percent of Responses Indicating Effective DL
Staff Training Applications by Role

	1 N=9	2 N=66	3 N=51	4 N=106	5 N=111	6 N=162	7 N=28	8 N=58	9	10 N=18
Using Tech	33.3	16.7	15.7	7.5	9.9	6.2	3.6	3.4	-	5.6
Teach w/ Tech	55.5	21.2	33.3	34.0	36.9	21.0	39.3	50.0	-	44.4
Inservice-General	-	30.3	25.5	16.0	24.3	22.2	28.6	20.7	-	27.8
Share Research/ Ideas	11.1	4.5	-	4.7	5.4	12.3	-	1.7	-	-
Train Admin. Staff	-	3.0	-	3.8	0.9	0.6	-	5.8	-	-
Train Support Staff	-	6.0	-	6.6	9.9	1.2	14.3	3.4	-	-
Train Begin. Teachers	-	1.5	-	2.8	-	2.5	7.1	-	-	11.1
Demo. by Experts	-	-	-	3.8	0.9	2.5	-	3.4	-	-
Improve Teacher Morale	-	3.0	-	2.8	0.9	-	3.6	3.4	-	-
Adv Courses/Degrees Recertifications	-	3.0	3.9	12.3	6.3	15.4	-	6.9	-	5.6
Management/ Discussions	-	-	7.8	1.8	4.5	1.9	3.6	5.8	-	-
Coord. Mtgs	-	7.6	3.9	3.8	-	8.6	-	-	-	-

Appendix G

Percent of Responses Indicating Effective
Administrative Applications of DL Technology by Role.

	1 N=9	2 N=32	3 N=39	4 N=60	5 N=69	6 N=80	7 N=11	8 N=23	9	10 N=11
Improve/Coord. Communication	22.2	15.6	7.7	8.3	14.5	8.8	9.1	8.7	-	-
Training	33.3	25.0	28.2	25.0	26.1	10.0	63.6	39.1	-	-
Meetings	22.2	34.4	46.2	56.7	52.2	43.8	18.2	39.1	-	81.8
Supplies	11.1	6.3	5.1	3.3	-	1.3	-	-	-	-
Recordkeeping	11.1	9.4	-	-	5.8	30.0	-	-	-	18.8
Teacher Eval./ Support	-	12.4	7.7	10.0	7.2	3.8	9.9	4.3	-	-
Proposals	-	-	5.1	-	-	-	-	-	-	-

Appendix H

Percent of Responses Indicating Preferred DL Technology for Instructional Applications by role

DL Technologies	1 N=11	2 N=64	3 N=43	4 N=67	5 N=127	6 N=158	7 N=33	8 N=82	9	10 N=25
Duplex	45.5	35.9	37.2	58.2	45.7	51.3	36.4	52.4	-	36.0
Audiographics	-	23.4	14.0	10.4	17.3	27.8	12.1	8.5	-	28.0
Simplex	9.1	17.2	16.3	16.4	18.1	8.9	21.2	22.0	-	12.0
Satellite	-	10.9	14.0	7.5	11.8	7.6	3.0	12.2	-	8.0
Other	45.5	12.5	18.6	7.4	7.1	4.4	27.3	4.9	-	16.0

Appendix I

Percent of Responses Indicating Preferred DL Technology for
Staff Training Applications by Role

DL Technologies	1 N=16	2 N=26	3 N=22	4 N=42	5 N=49	6 N=72	7 N=12	8 N=44	9	10 N=12
Duplex	31.3	57.7	31.8	69.0	50.8	45.8	33.3	45.5	-	25.0
Audiographics	-	15.4	13.6	9.5	18.6	29.2	25.0	6.8	-	16.7
Simplex	18.8	19.2	22.7	14.3	15.2	15.3	25.0	18.2	-	41.7
Satellite	-	-	13.6	2.4	5.1	8.3	-	11.4	-	-
Other	50.0	7.7	18.2	4.8	10.2	1.3	16.7	18.2	-	16.7

Appendix J

Percent of Responses Indicating Preferred
DL Technology for Administrative Applications by Role

DL Technologies	1 N=3	2 N=25	3 N=15	4 N=25	5 N=44	6 N=56	7 N=7	8 N=11	9	10 N=11
Duplex	66.7	48.0	66.7	60.0	61.4	46.4	57.1	63.6	-	36.4
Audiographics	-	4.0	13.3	8.0	9.1	23.2	14.3	-	-	18.2
Simplex	-	28.0	20.0	12.0	27.3	12.5	28.6	18.2	-	27.3
Satellite	-	8.0	-	16.0	-	12.5	-	18.2	-	-
Other	33.3	12.0	-	4.0	2.3	5.4	-	-	-	18.2

Appendix K

Percent of Responses Indicating Obstacles in Implementing DL
Instructional Applications by Role

Obstacles	1 N=12	2 N=50	3 N=34	4 N=60	5 N=138	6 N=102	7 N=17	8 N=66	9	10 N=9
Costs	16.7	24.0	32.4	30.0	29.7	32.3	29.4	33.3	-	22.2
Attitudes(Students, Teachers & Parents)	25.0	28.0	11.8	20.0	11.6	19.9	23.5	12.1	-	11.1
Attitudes (Parents, Community)	33.3	-	-	-	-	-	-	4.5	-	-
Space/Facilities	-	-	2.9	6.7	4.3	1.0	-	-	-	-
Time	8.3	2.0	-	-	-	-	-	-	-	-
Teacher Training	-	32.0	29.4	13.3	32.6	25.5	41.1	33.3	-	22.2
Equipment	-	4.0	5.8	3.3	0.7	2.9	-	7.5	-	11.1
Coord./Collab.	-	4.0	2.9	5.0	0.7	2.0	-	3.0	-	22.2
Tech. Expertise	-16.7	6.0	5.8	3.3	1.4	1.9	5.9	1.5	-	11.1
Determine Need	-	4.0	2.9	-	-	2.0	-	3.0	-	-
Copyright	-	-	2.9	-	-	-	-	1.5	-	-
Physical Isolation	-	-	-	-	-	1.0-	-	-	-	-

Appendix L

Percent of Responses Indicating Obstacles in Implementing DL
Staff Training Applications by Role

	1 N=5	2 N=25	3 N=24	4 N=36	5 N=63	6 N=60	7 N=8	8 N=38	9	10 N=9
Costs	20.0	28.0	45.8	30.6	42.9	36.7	37.5	42.1	-	33.3
Attitudes(Students, Teachers & Parents)	40.0	25.0	12.5	16.6	14.3	23.3	50.0	28.9	-	66.6
Attitudes (Parents, Community)	20.0	-	-	-	3.2	-	-	7.9	-	-
Space/Facilities	-	-	-	-	3.2	6.7	-	-	-	-
Time	-	4.0	12.5	19.4	4.8	8.3	-	-	-	-
Teacher Training	20.0	16.0	4.2	8.3	17.4	8.3	12.5	13.2	-	-
Equipment	-	16.0	4.2	-	-	8.3	-	2.6	-	-
Coord./Collab.	-	8.0	-	-	3.2	1.7	-	2.6	-	-
Tech Expertise	-	8.0	-	8.3	3.2	6.7	-	2.6	-	-
Determine Need	-	-	20.8	8.3	4.8	3.3	-	-	-	-

Appendix M

Percent of Responses Indicating Obstacles in Implementing DL
Administrative Applications by Role

Obstacles	1 N=4	2 N=18	3 N=9	4 N=23	5 N=42	6 N=40	7 N=7	8 N=19	9	10 N=6
Costs	25.0	16.7	77.8	52.2	47.6	50.0	44.4	36.8	-	33.3
Attitudes(Students, Teachers & Parents)	25.0	38.9	-	13.0	21.4	40.0	22.2	10.5	-	33.3
Attitudes (Parents, Community)	-	5.6	11.1	-	4.8	-	11.1	15.8	-	16.6
Space/Facilities	-	5.6	-	4.3	4.8	-	-	-	-	-
Time	25.0	-	11.1	8.7	9.5	2.5	-	-	-	16.6
Teacher Training	25.0	16.7	-	8.7	9.5	7.5	-	26.3	-	-
Equipment	-	11.1	-	4.3	-	5.0	11.1	5.3	-	-
Tech Expertise	-	5.6	-	8.7	2.4	2.5	11.1	-	-	-
Effectiveness	-	5.6	-	-	-	-	-	-	-	-

Appendix N

Percent of Responses Indicating Funding Options to Support DL Instructional Applications by Role

	1 N=9	2 N=31	3 N=30	4 N=37	5 N=2	6 N=0	7 N=2	8 N=1	9	10 N=4
Grants	44.4	45.2	33.3	45.9	100	-	100	100	-	75.0
Business	11.1	29.0	23.3	18.9	-	-	-	-	-	-
Legislature	33.3	6.5	20.0	13.5	-	-	-	-	-	-
District	-	9.6	33.3	8.1	-	-	-	-	-	-
Fee	-	-	-	8.1	--	-	-	-	-	-
Donation	-	-	3.3	2.7	-	-	-	-	-	-
Other	-	3.2	3.3	2.7	-	-	-	-	-	-

Appendix O

Percent of Responses Indicating Funding Options to Support
DL Staff Training Applications by Role

	1 N=4	2 N=19	3 N=27	4 N=20	5 N=1	6 N=0	7 N=0	8 N=0	9	10 N=6
Grants	75.0	73.7	51.8	50.0	1	-	-	-	-	50.0
Business	25.0	15.8	29.5	30.0	-	-	-	-	-	-
Legislature	-	10.5	7.4	-	-	-	-	-	-	16.7
District	-	10.5	11.1	15.0	-	-	-	-	-	16.7
Fee	-	-	-	-	--	-	-	-	-	16.7
Donation	-	-	-	15.0	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-	-	-

Appendix P

Percent of Responses Indicating Funding Options to Support DL Administrative Applications by Role

	1 N=4	2 N=13	3 N=12	4 N=17	5 N=1	6 N=0	7 N=2	8 N=0	9	10 N=0
Grants	50.0	46.1	50.0	70.6	100.0	-	50.0	-	-	-
Business	25.0	30.8	16.7	17.6	-	-	-	-	-	-
Legislature	-	-	-	5.9	-	-	-	-	-	-
District	-	23.1	33.3	5.9	-	-	50.0	-	-	-
Fee	-	-	-	-	-	-	-	-	-	-
Donation	25.0	-	-	-	-	-	-	-	-	-
Other	-	7.7	-	-	-	-	-	-	-	-

role/location

Appendix Q

EVALUATION

In your opinion, how useful were the following components of today's activities? Please check the number which most accurately represents your view.

	4 Very Useful	3 Useful	2 Somewhat Useful	1 Of Little Use
Distance Learning Overview				
Audio-Graphics Distance Learning Model				
Simplex Television Distance Learning Model				
Duplex Distance Learning Model				
Satellite Distance Learning				
Lunch				
Group Discusssion				

1. What did you like best about the day?

2. To improve the process for the future, what changes would you make?